

Application No. 10/057,003
Reply to Office Action dated December 18, 2002

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) A method for fault management of an electronic ballast for a gas discharge lamp comprising the steps of:

preheating filaments of the lamp by applying a low current for a predetermined time;

igniting the lamp by increasing at a predetermined increasing rate a voltage applied to the lamp up to a predetermined ignition value;

monitoring a lamp current of the lamp;

if the lamp current is over a predetermined threshold, repeating the steps of igniting the lamp and monitoring the lamp current for a predetermined number of times without repeating the preheating step if the lamp current is over a predetermined threshold; and

powering the lamp at normal operating conditions.

2. (Cancelled)

3. (Original) A method for fault management of the electronic ballast according to claim 1 wherein in a case after having repeated the steps of igniting the lamp and monitoring the lamp current for a predetermined numbers of times the lamp does not work correctly, said electronic ballast is turned off.

4. (Original) A method for fault management of the electronic ballast according to claim 1 wherein the preheating, igniting, monitoring, repeating, and powering steps are performed in response to a fault during lamp working.

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5. (Original) A method for fault management of the electronic ballast according to claim 4 wherein if the fault during lamp working occurs a predetermined number of times, said electronic ballast is turned off.

6. (Original) A method for fault management of the electronic ballast according to claim 1 wherein the preheating, igniting, monitoring, repeating, and powering steps are performed in response to a lamp removal.

7. (Currently Amended) A method for fault management of an electronic ballast for driving a gas discharge lamp at a drive frequency, comprising:

preheating filaments of the lamp by setting the drive frequency at a preheat frequency for a preheating period;

attempting to ignite the lamp by shifting the drive frequency from the preheat frequency to an operating frequency;

determining from a lamp current of the lamp whether the lamp has ignited within a predetermined ignition period; and

in response to determining that the lamp has not ignited within the ignition period, re-attempting to ignite the lamp by shifting maintaining the drive frequency from the preheat frequency to at the operating frequency without setting the drive frequency shifting to the preheat frequency for the preheating period.

8. (Original) The method of claim 7, further comprising performing the determining and re-attempting steps a predetermined number of times, and turning off the electronic ballast if the lamp does not ignite within the predetermined number of times.

9. (Original) The method of claim 7 wherein the electronic ballast includes a drive circuit that drives the lamp and a controller that controls the drive circuit, the controller including a timing and protection circuit that supplies a begin-preheating signal to begin the preheating period, disables the begin-preheating signal to end the preheating signal, continuously

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supplies a begin-ignition signal during the ignition period and during the re-attempting step, and continues to disable the begin-preheating signal in response to determining that the lamp has not ignited within the ignition period.

10. (Original) The method of claim 9 wherein the timing and protection circuit includes a timing capacitor and a flip-flop having an input coupled to the timing capacitor, a first output that produces the begin-preheating signal, and a second output that produces the begin-ignition signal, the method further comprising charging the timing capacitor in response to receiving a reset signal, measuring a voltage across the timing capacitor, determining whether the voltage across the timing capacitor exceeds a threshold, and, in response to determining that the voltage across the timing capacitor exceeds the threshold, driving the first output into a disabled state and driving the second output into an enabled state.

11. (Original) The method of claim 10 wherein the timing and protection circuit includes first and second current generators coupled to the timing capacitor wherein the charging step includes charging the timing capacitor using the first current generator during the preheating period and charging the timing capacitor using the second current generator during the ignition period.

12. (Original) The method of claim 10 wherein the timing and protection circuit includes first and second switches connecting the timing capacitor to the first and second current generators, respectively, the first switch being controlled by the begin-preheating signal and the second switch being controlled by the begin-ignition signal such that the first and second switches are controlled alternatively.

13. (Currently Amended) An electronic ballast for a gas discharge lamp having a plurality of filaments, comprising:

means for preheating filaments of the lamp by setting the drive frequency at a preheat frequency for a preheating period;

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means for attempting to ignite the lamp by shifting the drive frequency from the preheat frequency to an operating frequency;

means for determining from a lamp current of the lamp whether the lamp has ignited within a predetermined ignition period; and

means for, in response to determining that the lamp has not ignited within the ignition period, re-attempting to ignite the lamp ~~by maintaining the drive frequency at the operating frequency without setting the drive frequency at the preheat frequency for the preheating period~~ shifting to the preheat frequency.

14. (New) A method for fault management of an electronic ballast for driving a gas discharge lamp at a drive frequency, comprising:

preheating filaments of the lamp by setting the drive frequency at a preheat frequency for a preheating period;

attempting to ignite the lamp by shifting the drive frequency from the preheat frequency to an operating frequency;

determining from a lamp current of the lamp whether the lamp has ignited within a predetermined ignition period;

in response to determining that the lamp has not ignited within the ignition period, re-attempting to ignite the lamp by repeating the attempting and determining steps;

wherein the electronic ballast includes a drive circuit that drives the lamp and a controller that controls the drive circuit, the controller including a timing and protection circuit that supplies a begin-preheating signal to begin the preheating period, disables the begin-preheating signal to end the preheating signal, continuously supplies a begin-ignition signal during the ignition period and during the re-attempting step, and continues to disable the begin-preheating signal in response to determining that the lamp has not ignited within the ignition period, and wherein the timing and protection circuit includes a timing capacitor and a flip-flop having an input coupled to the timing capacitor, a first output that produces the begin-preheating signal, and a second output that produces the begin-ignition signal; and

charging the timing capacitor in response to receiving a reset signal;

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measuring a voltage across the timing capacitor;

determining whether the voltage across the timing capacitor exceeds a threshold;

and,

in response to determining that the voltage across the timing capacitor exceeds the threshold, driving the first output into a disabled state and driving the second output into an enabled state.

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15. (New) The method of claim 14 wherein the timing and protection circuit includes first and second current generators coupled to the timing capacitor wherein the charging step includes charging the timing capacitor using the first current generator during the preheating period and charging the timing capacitor using the second current generator during the ignition period.

16. (New) The method of claim 14 wherein the timing and protection circuit includes first and second switches connecting the timing capacitor to the first and second current generators, respectively, the first switch being controlled by the begin-preheating signal and the second switch being controlled by the begin-ignition signal such that the first and second switches are controlled alternatively.